National Aeronautics and Space Administration

NASA ROBOTICS ACADEMY AT MARSHALL SPACE FLIGHT CENTER

PROFILE BOOK 2011

This is NASA's vision for the future. Our mandate is:

- To improve life here,
- To extend life to there,
- To find life beyond.

So, how do we get to that impressive picture of the future? Part of the answer is by executing NASA's mission:

- ***To understand and protect our home planet.***
- ***To explore the Universe and search for life.***
- ***To inspire the next generation of explorers … as only NASA can.***

Table of Contents

PROGRAM DESCRIPTION **1**

ELIGIBILITY, SELECTION CRITERIA, AND PLACEMENT **1**

A BRIEF HISTORY OF THE NASA ROBOTICS ACADEMY **2**

FLIGHT ROBOTICS LABORATORY **4**

JESUS BETANCOURT-ROQUE 5

HEATHER ALPERN 7

PRONOY BISWAS 9

DAVID B MITTELMAN 11

FEATHERSAIL TEAM **14**

COLLIN BEZROUK 15

WILL BURNS 17

KATHERINE CZAPLICKI 19

DANIEL GOFF 21

RCSP AND GLXP TEAM **24**

EVAN HELMEID 25

ALLEN BORDELON 27

TIMOTHY HOLLAND 29

JOSHUA HOOKS 31

STAFF **33**

PROGRAM DIRECTOR 33
PROGRAM MANAGER 33
OPERATIONS MANAGER 34

LINKS **35**

Program Description

The NASA Robotics Academy is an intensive resident summer program of higher learning for college undergraduate and graduate students interested in pursuing professional and leadership careers in robotics-related fields.

The NASA Robotics Academy program is designed to present a comprehensive package of information and experiences about the organization of the NASA Agency, some of its most important current and planned science, engineering, education, and technology enterprises, as well as a number of non-technical areas of critical significance. Besides attending lectures and workshops with experts in their field, the Robotics Academy students are involved in supervised research in a MSFC laboratory, and will participate in visits to other NASA Centers and a number of robotics-related academic laboratories and industries.

Eligibility, Selection Criteria, and Placement

The participants in the Marshall NASA Robotics Academy have been selected based on the following criteria:

- US citizenship or permanent residency
- Research Associates: Rising college freshman
- and sophomores
- Team Leads: Junior/senior undergraduates or
- graduate students
- High academic standing (GPA 3.0 or higher)
- Demonstrated prior involvement in robotics
- Propensity for teamwork

Both the selection process and placement of the Academy participants in Marshall's research groups were assisted by recommendations from faculty, administrators, academic supervisors, and co-workers, and the applicants' self-profiling essays.

Brief History of the NASA Robotics Academy

The NASA Robotics Academy was founded in 2005 at the Goddard Space Flight Center (GSFC) with a vision to expand to other NASA centers. The Ames Chapter opened in 2006 and in 2007 Marshall Space Flight Center also began their preliminary year of the Robotics Academy.

The Robotics Academy began with the insight that robotics plays a critical role in NASA's Space Exploration Vision. The NASA Robotics Academy provides a pathway for students interested in careers in this exciting field. It can provide a bridge from high school programs such as FIRST, Botball and BEST to continued involvement in robotics research through undergraduate and graduate levels.

This year, the NASA Robotics Academy at Marshall Space Flight Center (MSFC) will train its fifth generation of Research Associates, building upon the program's four years of success.

The NASA Flight Robotics Laboratory at MSFC operates many robotic systems to simulate and develop new technology for avionics and dynamic control of rockets and spacecrafts. These systems include two air-bearing vehicles configured for automated docking and rocket avionic motion simulation, a Dynamic Overhead Target Simulator (6-degrees of freedom robotic arm), a Dynamic Solar Simulator, a tilt table, and many more.

The team's main objective for the 2011 Summer Internship is to improve the performance of the automated air-bearing vehicle designed to aid in research of space vehicle docking operations. Such performance improvements include upgrading to more robust control algorithms, enhancing the system's data logging capabilities, and the addition of a remote controller for robotic tele-operation and tele-presence investigations.

Additional tasks to improve the performance of the air-bearing vehicle include floor characterization and analysis using laser-tracker measurements and CAD software, incorporating the floor characterization into the robot, and the addition of bump avoidance algorithms depending on the characterization of the bumps and the robot's capabilities.

Secondary projects, depending on time and laboratory requirements, include improvements to the control software of the 6-degrees of freedom robotic arm. These projects consist of implementing a new networking configuration, the development of more robust control software, and the incorporation of the solar simulator and tilt table into one control interface.

Principal Investigator: *Ricky Howard*

Team Lead: *Jesus Betancourt-Roque*

Research Associates: *Heather Alpern*
Pronoy Biswas
David Mittelman

Jesus Betancourt-Roque

University of Texas in El Paso
El Paso, TX
Mechanical Engineering - Master of Science 2011
Instituto Tecnológico y de Estudios Superiores de Monterrey
Juarez, Chihuahua
Mechatronics Engineering, Bachelor of Science 2008
Email: jbetancourtroque@miners.utep.edu

Research and Experience

- **Graduate Research Assistant, Center for Space Exploration Technology Research (cSETR)**
  - Research on LOX/Methane & LOX/Hydrogen ignition physics and combustion
    - Design of multi-purpose optically accessible combustion chamber test rig
    - Design of single element coaxial injector
  - Liquid rocket cryogenic feed system design
    - Collaboration on development of cryogenic fuel feed system for Liquid Oxygen and Liquid Methane propellants, including FMEA, safety documentation and instrumentation
- **Test-Engineering Associated, Fuel systems manufacturing and testing**
  - Technical support and problem solving for XPI (extra high pressure injector) functional test and calibration machines
    - Troubleshooting of automated machines for electrical, data acquisition, remote control and hydraulic failures
    - Implementation and validation of improvement updates, SPC data analysis and hardware diagnostics
    - Development of preventive maintenance routines
  - XPI manufacturing stations design update and efficiency improvement of Human Machine Interface logic sequence
- **DELPHI Co-Op, Independent Test and Verification (IT&V) for crash and occupant sensing systems**
  - Analysis of functional requirements and documentation of hardware and software for microcontroller-based-operating systems
  - Development and execution of functional test procedures
  - Hardware test, software test, analysis of algorithms and sensor reading
  - Report of results and failures found in while testing, failure tracking until complete solution is achieved

Membership and Activities

- American Institute of Aeronautics and Astronautics
- American Society of Mechanical Engineers
- College Physics Science study group

Honors and Awards

- Spring 2011. University of Texas at El Paso tuition support stipend.
- 2003-2008. Instituto Tecnologico y de Estudios Superiores de Monterrey scholarship award.

Special Skills

- Software Tools
  - Unigraphics NX
  - AutoCAD
  - MSC Nastran
  - Altair Hypermesh & Optistruct
  - MS Office
  - MINITAB
  - MATLAB Simulink
  - Hyperterminal
  - Wolfram Mathematica
  - MPLAB IDE
- Programming Languages
  - Visual Basic
  - Assembler
  - C++
  - Fox Pro/Visual Fox Pro
  - Borland Pascal

Hobbies

Handyman, Gym workout and nutrition, Vehicle custom modification

Personal Statement

I was born in El Paso, Texas on March 9, 1985. I am the youngest of three siblings. Since I was a child, I used to disassemble electronics to see what was inside of them and how they worked. Throughout my school years, I have been involved in computer programming, robotic competitions, and automated devices. I earned my first computer-related degree as a programming technician in high school. While attending college, I worked on several school projects related to robotics; for instance, remote controlled vehicles and automated manufacturing components. I also gained experience working in software testing from Co-Ops in the automotive industry. Finally, in May 2008, I earned my Bachelors of Science degree in Mechatronics Engineering and went to work for two years as Testing Engineer for an automated manufacturing company.

Currently, I am pursuing a Master of Science degree in Mechanical Engineering at University of Texas at El Paso (UTEP). I am also working as Research Assistant at the Center for Space Exploration Technology Research (cSETR), a NASA University Research Center (URC), and I will be graduating in December 2011.

Heather Alpern

Alfred University
Alfred, NY
Mechanical Engineering
Fine Art and Mathematics Minor
Bachelor of Science December 2011
Email: hra2520@aol.com

Research and Experience

- **Valley Mill Camp,** Darnstown, MD. *Senior Group Counselor*, Summer 2003 - 2009
  - Managed and lead a group of twenty-two children, while instructing them in kayaking, canoeing, rock climbing, horseback riding, swimming, archery and air rifle
  - Certified in Adult and Child CPR and AED and Standard First Aid
  - Maintained a safe environment for children to develop new skills and have fun
  - Collaborated with co-counselors on leadership responsibilities
- **Valley Mill Camp,** Darnstown, MD. *CDL Driver*, Summer 2009 - 2010
  - Provided safe transportation for fifteen children and staff to and from camp
  - Handled crisis situations, on and off the school bus, in a calm and effective manner
- **Valley Mill Camp,** Darnstown, MD. *Administrative Assistant and Maintenance*, Summer 2010
  - Repaired machines and aided staff so the camp could operate efficiently

Membership and Activities

- **Yachad Home Repair Program, non-profit:** Fall 2007
- **AU Robot Club Liaison to Student Senate**: Fall 2009
- **Independent study building and competing VEX Robots:** Spring 2010
- **Treasurer of AU Diversity Club:** Fall 2010 – Fall 2011

Honors and Awards

- Nominated by Head of High School to represent the State of Maryland at the 2006 National Student Leadership Conference
- Participated in McLean School basketball team – Leadership Award
- Scholar-Athlete 2005-2007
- 2007 Senior Project – Constructed, painted, and comprehended the inner workings of a wooden pendulum clock – High Honors
- Top Student of graduating class in Art and in Science
- Awarded Dean's Scholarship from Alfred University

- National Dean's List 2007-2011

Special Skills

- Machining
  - Metal casting and forging
  - Plasma cutter
  - MIG welder
  - Horizontal band saw
  - Angle cutter/grinder
  - Mill
  - Lathe
- Computer
  - Microsoft Office Suite
  - SolidWorks
  - MATLAB
  - Fortran 90
  - GNU/Linux

Hobbies

Puzzles, art, building models, sports, taking things apart

Personal Statement

I am a Senior at Alfred University majoring in Mechanical Engineering and minoring in Mathematics and Fine Arts. I plan to graduate from Alfred in December 2011 and go on to do work with robotics and/or machine design. I was born in the Washington DC area and raised in Rockville, Maryland where I attended McLean School of Maryland.

During my time at McLean, I learned to be a strong leader, whether this meant in class working on a group project or on the basketball court working with my teammates. I also worked as a counselor and bus driver at Valley Mill Camp, where I gained additional leadership skills. I went on to Alfred to study engineering and art, both of which I have loved since I was very young. After many intense classes and group projects, I have learned a great deal and am looking to apply all my knowledge and skills to the work I do while at the NASA Robotics Academy.

Pronoy Biswas

Carnegie Mellon University
Pittsburgh, PA
Electrical and Computer Engineering
Class of 2014
Email: pronoy.biswas@gmail.com

Research and Experience

- **Formula SAE (Society of Automotive Engineers)** 2010-2011
  - **Designed and Fabricated Racecar Dashboard,** *Electrical Engineering*
  - **Fabricated Racecar Tube-frame Chassis,** *Metalworking/Welding*
- **Columbia Lab for Unconventional Electronics (CLUE) at Columbia University**
  - **Designed Source Measurement Unit**, *Electrical and Computer Engineering* Summer 2010
  - Developed low-cost, computer controlled, test platform for organic semiconductor devices using Arduino.
  - **Built Instructional Circuits**, *Elec./Computer Engg.* Summer 2009
  - Used Arduino-based circuits to teach high school students principles of electronics. Developed microcontroller libraries to interface with special-purpose chips and enabled an Arduino to play music, and a Serial Communication illustrator circuit.
- **FIRST Tech Robotics Challenge,** *Elec./Mech. Engineering* 2009-2010
  - Competed in FIRST World Championship, placed 1st in Pennsylvania State tournament, received Inspire awards in NY, NJ, and DE Tournaments.
  - Built robot in team that could competitively collect, store and shoot 30 whiffle balls into goals at various heights and distances. Worked on mechanical design, gearbox, visual feedback system for driver, motor overheating protection system, and opponent robot database.
- **High School Senior Design Project,** *Electrical and Mechanical Engineering* 2009-2010
  - Created a digital personal trainer for the pull-up exercise that provided feedback on exercise form, repetitions, calories, and long term progress.
- **System for the Hybridization of All Road Cars (SHARC)** *Elec/Mech. Engg* Spring 2009
  - Developed a concept to make all cars into plug in hybrids. Inventnow Patent.
- **C++ Flash Card Engine** *Computer Science*: Spring 2009

- Developed C++ library to manage and display digital flash cards. And programmed a personalized SAT Vocabulary Trainer.

Membership and Activities

- Member, Carnegie Mellon Racing Formula SAE Team. Fuel tank, electronics, and chassis designer/fabricator (2010-current)
- Member, volunteer, referee, Say Watt? FIRST FTC Robotics team (2009-current).
- Science and Technology writer for School Newspaper (2006-2010).

Honors and Awards

- Carnegie Scholarship (2010,2011)
- Middlesex County Academy Foundation Silver Scholarship (2010)
- Treasurer, National Honor Society (NHS) (2010)
- Liberty Science Center Partners in Science Research Internship at Columbia University (2009,2010)
- 1st place New Jersey Physics League (2010)
- 2nd place in Chemistry Science League Team (2009)
- President's Education Award in recognition for Outstanding Academic Achievement (2007-2010).

Special Skills

- Software Tools
  - Microsoft Office
  - SolidWorks
- Computer Languages
  - C/C++
  - Python
  - Autohotkey
  - Labview
  - Assembly for PIC and AVR
- Hardware
  - PIC/AVR Microcontrollers
  - Arduino

Hobbies

Piano, origami, swimming, biking, weightlifting, volunteering at local garage

Personal Statement

Pronoy Biswas is a 2nd year college student studying Electrical and Computer Engineering at Carnegie Mellon University. He enjoys designing electronics and machining/welding components for the Carnegie Mellon Formula SAE racecar, playing piano, building Lego/K'nex models, and working in general with electronics/robotics. His hometown is Edison, NJ where he studied at the Middlesex County Academy High School and designed mechanical and electrical components for the local FIRST Tech Challenge robotics team, Say Watt?

David B Mittelman

University of Connecticut
Storrs, CT
Computer Science and Engineering, BsE 2012
Cognitive Science, BA 2012
Email: dbmittelman@gmail.com

Research and Experience

- **Idea Development Empowering Architects for a better Society** – *Board Member*: May 2009 to Present
  - Currently working with a core team to prepare for first round of initial investment.
  - Future projects will make society-wide improvements that cross both ethnic and social economic lines.
  - Oversaw incorporation of IDEAS, an environment for peer-supported innovation.
- **REU Experimental Research in Wireless Networking** – *Intern*: Summer 2009
  - Explored the viability of an embedded Distributed Computing Cluster
  - Compared the energy cost and heat dissipation to a "normal" comparative Distributed Computing Cluster
  - Worked individually, but met regularly with a team to discuss issues and project direction
- **United States Navy** – *Submarine Sonar Technician, Petty Officer Second Class*: September 2005 to May 2008
  - Graduated in top 10% of class during training
  - Promoted to a supervisory role within 9 months of enlisting
  - Made rank at twice the average rate of peers
  - Managed equipment calibration induction desk for the Naval Support Facility
    - Developed database for over 180,000 records, reducing induction time by 80%
    - Trained entire workshop on database operations

Membership and Activities

- Association for the Advancement of Artificial Intelligence
- Institute of Electrical and Electronics Engineers
- Undergraduate Student Government Funding Board
- FIRST Robotics Competition
- Old Lyme Volunteer Fire Department

Honors and Awards

- Honor Societies: *Tau Beta Pi, Upsilon Pi Epsilon, Golden Key International Honour Society, Phi Kappa Phi, National Society of Collegiate Scholars*
- Dean's List of Academic Honor: *University of Connecticut College of Engineering*

Special Skills

- Software Tools
  - Microsoft Access
  - Linux, Windows OS, Mac OS
  - Networking
  - Parallel & Distributed Computing
- Programming Languages
  - C/C++
  - Prolog, Python
  - Java
- Other
  - Machine Learning
  - Knowledge Representation & Reasoning
  - Artificial Intelligence methods
  - Message Passing Interface
  - Neural Networks

Hobbies

Scuba diving, Photography, World Travel

Personal Statement

After graduating high school in 2002, I attended Boston University to study Computer Engineering as a member of their Naval Reserve Officer Training Corps, and Massachusetts College of Art studying Photography and Art History.

In the Fall of 2005 I enlisted in the Navy as a Submarine Sonar Technician, graduating training in the top of my class, and served on the USS Memphis. I returned to school at the University of Connecticut in 2008, studying Computer Science & Engineering, and Cognitive Science. During the summer of 2008 I helped set up a technology summer camp for underprivileged teenagers in Israel.

While at the University of Connecticut, I have served as a Resident Assistant for the past two years. I have also served as Vice Chairman of a key Undergraduate Student Government committee, gained acceptance into the Honors program, and maintained a GPA in the top 10% of my class. My entire third year I studied abroad at the University of Leeds in England, traveled above the Arctic Circle, visited 10 countries in both hemispheres, toured CERN, saw the Northern Lights, dove to depths greater than 100 feet, and saw the sun rise before the rest of the world. Whatever I do in life, it has to challenge me and drive me to push my limits.

The Robotics Academy team is designing a solar sail satellite that deploys 16 sails. Pairs of sail can be rotated independently about the axis of the boom they are mounted to, which is referred to as “feathering”. With unique combinations of sail feathering, the satellite can obtain a very simple means of attitude control about all three principal axes.

With this degree of maneuverability, many long-duration complex missions are possible. For example, FeatherSail could easily obtain a polar orbit about the sun, maintain a non-Keplerian orbit at any Lagrangian point, or be able to frequently change position in earth orbit. These missions are possible because FeatherSail utilizes solar propulsion and therefore, fuel reserves will no longer be the limiting factor on mission duration.

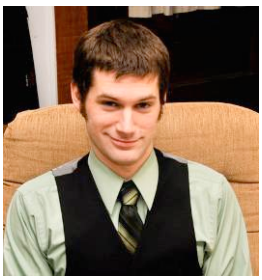
The student team is responsible for four main design focus areas that should yield a near-complete design. The first focus area is the mission concept, design, and detailed analysis proving feasibility. Second, the avionics components will be selected to minimize weight and power while achieving mission defined science and operational objectives. The third area is structural design, including bus, pods, deployable booms, and de-tumble stage. Finally, all mechanisms will be designed; particularly the ones that drive the sail feathering, boom deployment, and de-tumble stage separation.

Principal Investigator: *Dean Alhorn*

Team Lead: *Collin Bezrouk*

Research Associates: *William Burns*
Katherine Czaplicki
Daniel Goff

Collin Bezrouk



University of Wisconsin - Madison
Madison, WI
Engineering Mechanics
Bachelor of Science 2011
Email: bezrouk@wise.edu

Research and Experience

- **NASA JPL Space Grant Internship** – *Symbolic Computing Initiative*: June 2010 to August 2010
  - Modeled the dynamics of the Mars Science Lab "Skycrane" landing system
  - Evaluated two symbolic computation programs to determine which one JPL should provide for all of its employees.
- **Marshall Space Flight Center** – *NASA ESMD Intern, Microwave/Millimeter Wave Nondestructive Evaluation*: September 2009 to December 2009
  - Programmed, assembled, performed scans with, and analyzed data from multiple microwave/millimeter wave scanners
  - Increased the scanner speed by 200%, programmed a new data acquisition device, created new data visualization tools to enhance scan resolution
- **Academic Design Projects**
  - WSGC Student Rocket Design Competition (3 years): Designed, constructed, launched, and analyzed a high powered model rocket to meet defined objectives.
  - Senior Design Project: Designed a satellite that collects solar power from orbit and delivers to the lunar surface via laser to enable human habitation of the moon. Team lead in a group of five.

Membership and Activities

- American Institute of Aeronautics and Astronautics: *President*
- WSGC Student Rocket Design Competition
- Science Olympiad Outreach Program Volunteer
- Lego League Competition Volunteer

Honors and Awards

- Engineering Mechanics Department Scholarship
- Dean's Honor List (7/7 semesters)
- Big Ten Leadership Completion Award
- AP Scholar with Distinction

Special Skills

- Software Tools
  - MATLAB
  - Labview
  - Ansys
  - SolidWorks
  - Engineering Equation Solver
- Programming Languages
  - C#/C++, Maple
- Machining
  - Mill, Lathe, Drill Press, Band Saw

Hobbies

Distance running, mountain hiking, space-themed video games

Personal Statement

I have been a space enthusiast since I first saw footage of a Saturn V liftoff when I was eight years old on the Discovery Channel. I have been an engineer since I received my first set of Duplo blocks when I was three and could never stop building things. Recognizing these two passions from an early age, and how they can easily be combined in a career in the aerospace industry, has inspired me to focus and develop my academic and professional development throughout most of my life. This includes a drive to develop my leadership, networking, technical writing, and presentation skills in addition to a technical knowledge base.

I am a senior studying Engineering Mechanics and Astronautics at the University of Wisconsin – Madison and plan to graduate in May 2012. I have recently completed my capstone design course where I served as team lead and designed a mission and the thermal control system for a laser power-beaming satellite. I have also had two very successful NASA internships. The first was at Marshall Space Flight Center programming microwave non-destructive evaluation scanners and improving data visualization techniques, which have greatly increased the capabilities of the lab. The second was at the Jet Propulsion Laboratory modeling the dynamics of the Bridle and Umbilical Device landing architecture for the Mars Science Lab, which included my recommendation for software to be made available to all JPL employees. My future career goals are to obtain a position at NASA Ames or JPL working in advanced mission concept and design as well as guidance, navigation and control.

Will Burns

Tennessee Technological University
Cookeville, TN
Electrical Engineering
Business and Mathematics Minor
Bachelor of Science 2012
Email: wkburns42@students.tntech.edu

Research and Experience

- **TTU Office of Research and Graduate Studies –** *Student Worker*: Spring 2009 to Spring 2011
  - Answer phones
  - Make deliveries
  - File papers
- **TTU Athletics Department –** *Tutor*: *Spring 2010*
  - Calculus II
  - Calculus-Based Physics I
- **YMCA –** *Lifeguard*: Summer 2010
  - Graduated Ellis Lifeguard Training Program

Membership and Activities

- IEEE - Institute of Electrical and Electronics Engineers: 2009 - present
- Student Government Association Senator: 2010 - present
- Tennessee Intercollegiate State Legislature: 2010
- Tennessee Tech Lacrosse Club Vice-President: 2009 - present

Honors and Awards

- Kappa Mu Epsilon – Mathematics Honor Society
- Eta Kappa Nu – Electrical Engineering Honor Society
- Omicron Delta Kappa – National Leadership Honor Society
- Dean's List: 2008 – present

Special Skills

- Software Tools
  - AutoCAD
  - MATLAB
  - MS Windows
  - MS Office
  - LT spice
- Programming Languages
  - C Programming

Hobbies

- Lacrosse
- Hiking
- Playing guitar and singing
- Traveling
- Snowboarding
- Reading
- Using the Internet

Personal Statement

I was born and raised in Nashville, TN. While in high school, I was involved in the Science Olympiad team and played lacrosse all four years. I graduated from Father Ryan High School and decided to attend Tennessee Technological University to pursue engineering. I began college in Basic Engineering and decided on my major during my Physics II class. Now I am currently majoring in Electrical Engineering and minoring in Business and Math. I have recently completed my junior year and plan to concentrate in controls and telecommunications. During the school year, I stay involved in many different activities on campus.

I am the student coach and a player for our club lacrosse team. This past year I have communicated with schools in and around Tennessee to help create a new conference for our team in the National College Lacrosse League. By being involved in the lacrosse club and student government, I have learned valuable teamwork and leadership skills. I have learned to step up and be a leader or to fit into a specific position to work towards the goal of the group.

As I have grown up, I have become more interested in the business side of engineering. I want to get my Masters in Business Administration eventually, but I can see myself working for some time after I finish my undergraduate degree. Since I have begun taking upper level engineering courses, I have also strongly considered studying Electrical Engineering or possibly Aerospace Engineering in graduate school. I know working for NASA will inspire my scientific curiosity enormously and help guide me to where I want to be.

The important hands on experience I will gain this summer will allow me to apply the concepts I have learned in my classes. My dream is to use my talents in the best way possible to help the world. I enjoy getting to know people and look forward to meeting everyone this summer. I am very thankful for these opportunities I have been given.

Katherine Czaplicki

Rose-Hulman Institute of Technology
Terre Haute, IN
Mechanical Engineering
Computer Science Minor
Bachelor of Science 2014
Email: Katherine.Czaplicki@rose-hulman.edu

Research and Experience

- **Rose-Hulman Institute of Technology** – *Teaching Assistant for Introduction to Software Development:* Spring 2011
  - Assisted students, both in and out of the classroom
  - Coursework included Python, C, and robot control
- **Operation Catapult** – *Participant:* Summer 2009
  - Conceptualized and designed a mechanical hand with pulley control mechanism
  - Machined and assembled the mechanical hand
  - Prepared report and presented at project fair
  - Earned first place for best project out of over 40 groups
- **Camp Invention**, Sugar Land, TX – *Counselor*: Summers 2008 & 2010
  - Educational camp for elementary school students
  - Assisted seven teacher with preparing daily activities
  - Encouraged creative problem-solving and critical thinking skills
- **Children's Museum of Houston**, Sugar Land, TX – *Volunteer Docent*: Summer 2007-08
  - Helped children understand and explore museum activities

Membership and Activities

- Rose-Hulman SAE Formula 1 Club
- Rose-Hulman Student Alumni Association
- Habitat for Humanity – *Building Coordinator*
- Rose-Hulman Fencing Club
- Clements HS Band – *Vice-President, Uniform Captain, French Horn Section Leader, Principal French Horn in Symphony Orchestra*

Honors and Awards

- Awarded Rose-Hulman Merit Scholarship
- Received award for 4.0 in first and second quarters
- Alpha Lambda Delta Honor Fraternity
- Graduated Cum Laude from Clements High School
- National Honor Society
- German National Honor Society

Special Skills

- Software Tools
  - Solid Edge
  - Maple
- Programming Languages
  - Java
  - C
  - Python
- Machining
  - Mill, lathe
  - Drill press
  - Vertical/horizontal band saws
  - MIG and TIG welding

Hobbies

Reading, tie dying, traveling, listening to music, hiking, Frisbee, canoeing

Personal Statement

I am currently a rising sophomore at Rose-Hulman Institute of Technology, majoring in Mechanical Engineering and minoring in Computer Science. In high school, I enjoyed my participation in many organizations, including Habitat for Humanity and the German National Honor Society. The most rewarding extracurricular activity was concert and marching band. As the band Vice President and French Horn Section Leader, I had the opportunity to encourage others, build consensus, and organize events and contests.

I have always enjoyed working with my hands, with childhood hobbies of pottery, quilting, and helping with home repairs and improvements. During a summer program at Rose-Hulman, I won first place for building a robotic hand with mechanical controls for movement, and became interested in learning computer science to take it to the next step. Now at Rose full-time, I continue work in the machine shop by designing and building a Formula1 style racecar with the FSAE team. I am also a member of the Alpha Lambda Delta Honor Fraternity and the Student Alumni Association at Rose-Hulman.

My greatest strength continues to be team building and working to help others set and achieve their goals. I am a Teaching Assistant for the computer science department, and next year I will have the honor of being a Sophomore Advisor to the incoming freshman class. Meanwhile, I am enjoying an awesome summer internship with the NASA Robotics Academy at Marshall Space Flight Center.

Daniel Goff

University of Florida
Gainesville, FL
Aerospace and Mechanical Engineering
Bachelor of Science 2013
Email: goffhawkeye@gmail.com

Research and Experience

- **Design/Build/Fly Team –** August 2009 to April 2011
  - Worked with a team of over 20 people in Spring 2010 to design a transport capable RC Airplane
- **Resident Assistant –** March 2011 to Present
  - Supervised and aided 30 residents as a peer in a residence hall

Membership and Activities

- American Institute of Aeronautics and Astronautics
- Team Florida Cycling Club
- Tutor
- St Francis House – volunteer
- Habitat for Humanity
- UF Ultimate Club Team
- Mu Alpha Theta

Special Skills

- Software Tools
  - Solid Works
  - MATLAB
- Computer Languages
  - C++

Hobbies

Cycling, Running, Remote control planes, Ultimate Frisbee, Piano, Flying

Personal Statement

I was born and raised in Pensacola, FL, a medium sized Navy city. Being close to both the local airport and the Navy base, the home of the Blue Angels, my interest in aircraft grew rapidly. I went to high school in the International Baccalaureate program, learning how to try my hardest and do my best with everything. This background has followed through my life and now I am a junior in the Aerospace Engineering program at the University of Florida.

Following my interest in airplanes, I have flown small Cessnas with other family members. The feeling I get in those airplanes has helped me decide I want to fly for the rest of my life. Ultimately, I want to become a test pilot.

Outside of school and work, I enjoy cycling both for fun and in races. I have never participated in another sport that has as many engineers as cycling. I also run and play ultimate with my community. Staying in shape and meeting people are some of my top priorities.

Dynetics is leading the Rocket City Space Pioneers (RCSP) team in pursuit of the Google Lunar X-Prize (GLXP). The GLXP is a $30 million competition for the first privately funded team to send a robot to the moon, travel 500 meters and transmit video, images and data back to the Earth.

The RCSP project is currently in the 'Risk Reduction and Prototype' phase, performing trade studies, analysis, and component tests as inputs for design decisions. RCSP is targeting a launch and lunar mission in 2014.

To support this effort, the Robotics Academy team will be designing a Lunar Lander Prototype. This prototype will be a key step in the development process for the RCSP Lander. The design tasks will include:

- LLTB configuration
- Component specifications
    - Propulsion subsystem
    - Avionics subsystem
    - Electrical subsystem
- Mechanical design
- Electrical Schematics
- Cost analysis for LLTB fabrication and assembly
- Operational methodology

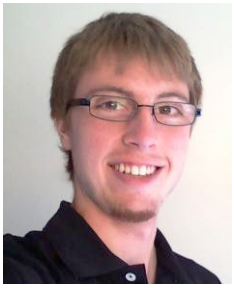
Principal Investigator: *Andy Crocker*

Team Lead: *Evan Helmeid*

Research Associates: *Allen Bordelon*
Timothy Holland
Joshua Hook

Evan Helmeid

Purdue University
West Lafayette, IN
Aeronautical and Astronautical Engineering
Spanish Minor
Bachelor of Science 2011
Email: erhelmeid@gmail.com



Research and Experience

- **Purdue University, School of Aviation Technology** – *Researcher* : November 2010 to Present
  - Develop concepts for the future of airport ground control
  - Promote the research team for large-scale development and increased demand for the technology
- **NASA Langley Research Center** – *LARSS*: June to August 2010
  - Increase the capabilities of the Aircraft Noise Prediction Program (ANOPP) to include effects of counter- rotating propfans by developing FORTRAN code and updating documentation
  - Create an interface between ANOPP and an efficiency program from Georgia Institute of Technology
- **NASA Langley Research Center** – *USRP*: June to August 2009
  - Transfer the Aircraft Noise Prediction Program Theoretical Manual from type-written text to LATEX
  - Update, validate, and verify accompanying FORTRAN code
- **Purdue University, School of Nuclear Engineering** – *Researcher*: January to May 2008
  - Assist Dr. Tsoukalas, Purdue School of Nuclear Engineering, with energy policy and global resource research.

Membership and Activities

- Virtual Community COHORT II, NASA Student Ambassador
- Purdue Sigma Gamma Tau, National Aerospace Engineering Honor Society
- Purdue FIRST Robotics Program
- Purdue Fall Space Day
- Purdue Emily Mauzy-Vogel Leadership Development Conference
- Purdue Boiler Gold Rush Student Orientation Program
- Purdue Engineering Projects in Community Service

Honors and Awards

- AGI University Grant Competition
- ATK Thiokol Propulsion S.P.A.C.E. Award
- Boeing Scholar

- Brunswick Corporation Scholar
- Purdue Valedictorian Scholar
- Purdue Academic Success Award
- Purdue Dean's List
- Purdue Semester Honors
- First Year Engineering Honors Program

Special Skills

- Software Tools
  - STK
  - TecPlot
  - CATIA V5
  - AutoCAD
- Programming Languages
  - MATLAB
  - C/C++
  - FORTRAN77-95
  - Latex
  - Unix

Hobbies

Volunteering, learning, teaching, leading by example, computer building, running, biking, soccer, hiking, sailing, camping, travel

Personal Statement

Evan Helmeid is a recent graduate of Aerospace Engineering at Purdue University in West Lafayette, IN. He is a two-time intern at NASA Langley Research Center in Hampton, VA, where he researched counter-rotating propfans and aeroacoustics prediction methods. He is currently a Team Lead and Research Associate with NASA's Marshall Spaceflight Center Robotics Academy. The team is developing a lunar lander test bed for the Google Lunar X-Prize Rocket City Space Pioneers team.

He has been a NASA Student Ambassador since the successful completion of his Undergraduate Student Research Program internship in 2009. His primary research interests are in spacecraft trajectory design and optimization with an emphasis on low-thrust spacecraft.

Space has been a passion of his since elementary school, and he has followed his dreams to where he is today.

Allen Bordelon

Louisiana State University
Baton Rouge, LA
Electrical & Computer Engineering
Mechanical Engineering, Digital Media, Math, and Computer Science Minor
Bachelor of Science
Email: AllenBordelon@gmail.com

Research and Experience

- **LSU LaACES Program**: August 2009 to Present
  - Propose, design, build, and fly scientific balloon payloads
- **LSU College of Engineering**: August 2008 to May 2010
  - Peer mentor for tour incoming freshmen
- **Iberville Parish School Board**: January 2008 to Present
  - Office work, Stage Director, Camp Counselor, Lego Robotics Coach
- **St. James Parish Science and Math Academy**: August 2004 to May 2006
  - Lego Robotics Coach

Membership and Activities

- Lego Robotics Team - Coach
- B.E.S.T. Robotics Team
- LSU IEEE Robotics Team
- LaACES
- MARSLIFE

Honors and Awards

- Herbert Hoover Young Engineering Award recipient 2004 and 2006
- Perfect score in math on both the GEE and the ACT

Special Skills

- Software Tools
  - AutoCAD
  - SolidWorks
  - MAYA
  - Microsoft Office
- Programming Languages
  - C++
  - MATLAB
  - Verilog
  - Basic

Hobbies

Videogames, robotics, computers, drawing, reading, archery, bilking swimming

Personal Statement

I was born and raised in the small town of Vacherie, Louisiana. I lived right on the water by Lake DesAlmonds and have fished out of my window before. I have always had an interest with space and spent many nights looking up at the stars. My interest with robotics began in high school when I was asked to start up and run a Lego Robotics team for the school. I have been coaching teams since and I have been involved with several other robotics competitions. I like to play around with electronics in my free time including building my own computer and RC robots. I also enjoy biking and usually bike around Baton Rouge rather than drive and have recently taken up traditional archery, something that I have wanted to do for years.

I graduated high school with honors and am now attending LSU for a dual degree in Electrical and Computer Engineering. I will graduate in May 2012 with my two degrees as well as four minors in Mechanical Engineering, Digital Media, Math, and Computer Science as well as a distinguished communicator's award. I am currently not planning to attend graduate school right away but would like to further my education someday.

University of North Dakota
Space Studies
Masters of Science 2012
Syracuse University
Aerospace Engineering
Biology Minor
Bachelor of Science 2010
Email: Timothy.Holland@und.edu

Research and Experience

- **University of North Dakota, Grand Forks, ND** - *Design Engineer - Directed by: Pablo de Leon, P.I.*: August 2010 to Present
  - Collaborated with a team to design and build a lunar habitat that incorporated the use of a suitiport system between a rover-base-spacesuit system. This was a NASA project receiving its funding under the NASA EPSCOR CAN 2009.
  - Designed parts using SolidWorks, and built parts using composite materials, and worked with contractors to build more parts.
- **Syracuse University, Syracuse, NY** - *Research Assistant - Directed by: Dr. Mark Glauser*: May 2009 to May 2010
  - Designed and built a modular acoustic wind tunnel at Syracuse University which will be used to study noise vibration on wind turbine blades.
  - Fused with the already built anechoic chamber and used the same facility as the existing jet noise system.
  - Led a student team and researched the design of acoustic wind tunnels from other universities studies.
  - Designed on SolidWorks and managed work sent out to contractors to build the specialty pieces of the tunnel and built the rest by hand, mostly woodworking. The project is an important part of The Initiative for Renewable Energy and the Environment (IREE), a signature program of the University of Minnesota's Institute on the Environment consortium which won a major DOE wind energy award worth 8 million dollars.
- **Margate City Beach Patrol, Margate, NJ** – *Lifeguard*: June 2002-Present
  - Certifications received: American Red Cross First Responder, First Aid and CPR
- **Notre Dame High School Robotics Club, Trenton, NJ** - *Founder and President*: September 2005 to June 2006

- **Volunteer Fire Fighter, Lawrenceville Station 23**: March 2002-August 2006
- **Assistant Swim Coach** - *University of North Dakota*: August 2010 to Present

Membership and Activities

- American Institute of Aeronautics and Astronautics
- United States of America Triathlon Association
- Explorers Club of New York City
- Margate City Lifeguard Association
- Students for the Exploration and Development of Space

Honors and Awards

- Invitee to Annual Astronaut Scholarship Luncheon
- Syracuse University Division I Swimming
- South Jersey Chiefs' Association Lifeguard Champion 2008
- Eagle Scout Award, The Boy Scouts of America

Special Skills

- Software Tools
  - MATLAB and Simulink
  - Pro/Engineer
  - Excel
  - Electronic Workbench NI Multisim
  - SolidWorks
  - Fluent
  - Gambit
  - LabVIEW 8
  - Maple
- Other
  - Woodworking
  - Composite Materials

Personal Statement

I am a second year Masters Candidate at UND in Space Studies. I work in the Space Suit Lab. My thesis is on Lunar Habitat design based on a suitiport system. I got my undergrad in Aerospace Engineering from Syracuse University. This summer I am working on the design of a prototype lunar Lander for Rocket City Space Pioneers for the company Dynetics for the Lunar Google X-Prize competition. I interested in space exportation from robotics to human space flight.

Joshua Hooks

University of Washington
Mechanical Engineering
Bachelor of Science
Email: hooksjrose@hotmail.com

Research and Experience

- **Romac Industries Incorporated** - *Mechanical Engineering Intern*: September 2010 to Present
  - Product testing and design to improve the CCL repair clamp.
  - Preparing NSF 61 approval for all Romac products.
  - Miscellaneous product testing, product design, report preparation and presentation of test reports
- **Research Assistant for Professor Weichih-Wang** - *Department of Mechanical Engineering, University of Washington*: March 2009 to June 2009, January 2010 to Present
  - Primary responsibility for assembling and testing a metal detector using fiber optic technology.
  - Prepared final report summarizing state of research and challenges remaining in prototype development
  - Acquired experience and familiarity in laboratory protocol, setting and meeting deadlines, and preparing progress reports.

Membership and Activities

- Math team
- Comets track - Coach: summer of 2008

Honors and Awards

- Co-author of paper
  - Wei-Shu Hua, Joshua Rosenberg Hooks, Nicholas Alan Erwin, Wen-Jong Wu, Wei-Chih Wang, "Fiberoptic metal detector capable of profile detection", *Proceedings of SPIE NDE health monitoring and Diagnostics, (SPIE 2011),* San Diego, California, USA, 6-10 March, 2011.
  - Wei-Shu Hua, Joshua Rosenberg Hooks, Wen-Jong Wu, Wei-Chih Wang, "Development of a polymer based fiberoptic magnetostrictive metal detector system", Proceedings of International Symposium on Optomechatronic Technologies, *(ISOT 2010)*, Toronto, Ontario, Canada, 25-27 October, 2010.
  - Wei-Shu Hua, Joshua Rosenberg Hooks, Wen-Jong Wu, Wei-Chih Wang, "Development of a novel polymeric fiber-optic magnetostrictive metal detector", *Proceedings of SPIE NDE health monitoring and*

Diagnostics, (SPIE 2010), Vol. 6395, San Diego, California, USA, 8-11 March, 2010.

- Dean's list Autumn quarter 2008, then Autumn quarter 2009-Autumn quarter 2010

Special Skills

- Software Tools
  - SolidWorks
  - MS Word
  - MS Office
- Programming Languages
  - Matlab

Hobbies

Football, Basketball, Volleyball, Cooking, Hiking, and Camping

Personal Statement

I grew up in Pullman, a small college town located in eastern Washington. I graduated from Pullman High School where I was captain of my Football, Basketball, and Track team. In high school, I learned how to be a great teammate and leader. Growing up in this small town taught me how to work hard. During my high school summers I would work on a farm, and during harvest would work 13 hours a day, seven days a week for a month and a half straight. This town taught me what it would take to succeed in life.

This year I will be a senior at the University of Washington where I am studying mechanical engineering with a specialization in system controls/mechatronics. I have been doing research in a mechatronics lab since my freshman year. This lab has taught me how to excel in a laboratory setting. When I first started in the lab, I helped graduate students with their own projects. Now I have my own project and I have other undergrads that help me. I learned when to be a follower and when to be a leader. I have also worked at Romac Inc. for the past year in their engineering department. At Romac, I have learned how to succeed in a professional setting. I started the redesign of a product and learned what it takes to get a product from the design stages to the market.

I realized I wanted to become an engineer after my high school math teacher told me that I think like an engineer. After that, I became extremely interested in anything with advanced technologies. Of course, this led to my desire of becoming a NASA engineer. NASA is the leader of cutting edge technologies, so that is where I want to be.

Program Director

Chrissa K. Hall

Chrissa Hall manages the Marshall Center Cooperative Education Program. She joined NASA in 1986 as a co-op student in Marshall's Office of Chief Counsel. In 1987, she was assigned to Marshall's Procurement Office where she later became a contract specialist and a full-time employee in 1991. In 2000, Hall was appointed training consultant and manager of the Cooperative Education in the Marshall Learning and Organizational Development Office, where she served until assigned to her current position in 2004.

The Tennessee Native earned an associate's degree in office administration from Calhoun Community College in Decatur, AL., in 1987, and a bachelor's degree in business administration from Athens State University in Athens, Ala., in1991. She and her husband Tim reside in Hartselle, AL. She enjoys traveling, working out at the gym, shopping and spending time with family.

Program Manager

Dr. Gerald R. Karr

Dr. Karr is a Professor of Mechanical and Aerospace Engineering at UAH. Since 1992, Dr. Karr has also served as the UAH Campus Director of the ASGC. Dr. Karr also served as the Chair of the Mechanical and Aerospace Engineering Department at UAH from 1986 through 1999. Dr. Karr has, since 1978, been the University Director of the highly successful NASA Summer Faculty Research Opportunity (NSFRO) program. Dr. Karr has also been an active researcher in the areas of satellite drag, high-energy lasers, cryogenics, spacecraft thermal design and computational fluid mechanics. Dr. Karr earned his BS (1964), MS (1966), and PhD (1969) in Aeronautical and Astronautical Engineering at the University of Illinois at Champaign-Urbana. For recreation, Dr. Karr enjoys golf, running, sailing and visiting with his children and grandsons.

Operations Manager

Jessica Tham

Jessica is an alumna of the 2008 and 2009 NASA Robotics Academy at MSFC and she returned last summer as the 2010 Operations Manager. She will graduate in November 2011 from Louisiana Tech University with a Bachelor of Science degree in Mechanical Engineering and a Minor in Mathematics. During the last academic year, Jessica worked as team lead on a multidisciplinary senior design team to further a NASA-related Worm-bot project originating from one of the 2010 NASA Robotics Academy at MSFC Teams. In the fall while finishing her undergraduate studies, Jessica plans to begin coursework on a Master's degree in Engineering Management.

"My ultimate life goal is to still be alive and kickin' when we as a human race develop force field, teleportation, and warp technology. After all, Space is the 'final frontier,' so let us explore it together. " –*Jessica Tham*

Links

- ***NASA MSFC Robotics Academy:***
  http://robotics.msfc.nasa.gov/

- ***NASA Robotics Academy Alumni Association:***
  http://www.roboticsalumni.org/

- ***NASA Academy Alumni Association:***
  http://www.nasa-academy.org/

- ***NASA Agency:***
  http://www.nasa.gov

- ***NASA Marshall Space Flight Center:***
  http://www.msfc.nasa.gov/

- ***Botball Robot Competition:***
  http://www.botball.org/

- ***For Inspiration and Recognition in Science and Technology:***
  http://www.usfirst.org/

- ***International Space University:***
  http://www.isunet.edu

- ***The Soffen Memorial Fund:***
  http://www.nasa-academy.org/soffen/fund.html